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Long-term disabilities and handicaps following sports injuries: outcome after outpatient treatment

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Abstract

Purpose: The aim was to investigate whether long-term disabilities and handicaps arise from a sports injury requiring outpatient treatment and to identify the potential risk factors.
Method: A representative sample was taken from a population of patients treated as outpatients due to a sports injury. The selected patients were sent a questionnaire, 2 – 5 years after the injury.
Result: Thirty-nine percent of the patients studied were unable to work for up to 1 month after the injury, 19% were not able to work for up to 3 months and another 5% could not work for a maximum of 8 months. Participation in sporting activities was hampered for up to 1 year in 76% of the patients and 11% had not resumed sports participation at all. In addition, 20% of the population stated that they still suffered from disabilities and handicaps following the sports injury. The outcome of the SIP68 underlines these results. Nine percent of the patients had a sumscore larger than 0. The variables which could be identified as risk factors were the body region: knee and sex: female.
Conclusions: Sports injuries requiring outpatient treatment can lead to long-term disabilities and handicaps, especially in patients with knee injuries and injuries in women. On average these consequences are less severe than those associated with inpatients; however, this finding is of great value since the number of outpatients is much higher than in patients admitted to a hospital.

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Introduction

Participation in sporting activities in the Netherlands results annually in 2.9 million injuries. A substantial number (209 000) of these patients require hospital treatment,[1] and almost 8% of this group is admitted.[2] It has already been proven that severe sports injuries can lead to long-term disabilities and handicaps if hospital admission is used as a criterion for injury severity.[3] Hereby, according to the World Health Organization (WHO), disability is defined as: 'any restriction or lack (resulting from an impairment) of ability to perform an activity within the range considered normal for a human being'.[4] The WHO definition of handicap is 'a disadvantage for a given individual, resulting from an impairment or a disability that limits or prevents the fulfillment of a role that is normal for that individual'. Impairment, as mentioned in the above definitions stands for any loss or abnormality of psychological, physiological, or anatomical structure or function. It might be expected that less severe sports injuries, not needing admission, could have less serious consequences. However, there are indications that considerable long-term consequences can occur following less severe injuries unrelated to sport.[5] It is unclear whether such a finding can also be applied to sports injuries.

The objective of this study is to investigate whether sports injuries treated in an outpatient setting can lead to long-term disabilities and handicaps, and to determine which factors contribute to the occurrence of these long-term consequences.

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Materials and methods

Between 1995 and 1998, 4537 patients between 17 and 60-years-of-age were treated for a sports injury in the outpatient department of the University Hospital Groningen. In order to examine whether long-term consequences arose from these injuries a random sample was taken. We aimed at a study population of 15–20 patients. If, as can be derived from other studies,[6, 7] 10–30% of the patients, treated in an outpatient hospital facility, will experience long-term disabilities and handicaps, at least 100 respondents should be involved. With an expected response rate of 50–60% (as in comparable studies)[8, 9] approximately 200 patients should be accessed. The sample was composed by entering every 20th consecutive patient into the study. In order to determine the representativeness of the sample, information on patient characteristics and injury details were collected. The patients received a postal questionnaire with items on absenteeism from work and sports, the question: 'do you still experience disabilities and handicaps following the sports injury?' and the 68 version of the Sickness Impact Profile (SIP68).[10–14] The latter is a generic measurement instrument in the field of disability and handicap. It consists of 68 items, subdivided into six categories; somatic autonomy, mobility control, emotional stability and psychological autonomy and communication scales, mobility range and social behaviour. The minimum sumscore is 0, and the maximum 68. A higher score indicates a worsening of the health status. Reference population data was available.[10–14]

Statistical analysis was performed using SPSS 10.0. Descriptive statistics were employed to determine the prevalence of long-term disabilities and handicaps. The Z-test for the equality between two proportions (binomial proportion) was carried out to compare respondents to non-respondents. One sample *t*-tests were used to compare the results of the SIP68 with a reference population. Logistic regression analysis was performed in order to determine whether a set of variables, such as age, sex, type of injury, body region, level of education, type of sport, level of sports participation, length of hospital stay, treatment and the Injury Severity Score (ISS)[15] served as risk factors. The ISS is an overall injury severity scale, extending from 0, no injury, to a maximum of 75 (a nearly 100% chance of death).

The dichotomized results of the question of whether patients still experience disabilities or handicaps (yes/no) due to the sports injury and the sumscore of the SIP68 (0 vs. larger than 0) were used as dependent variables.

Results

The inclusion of every 20th patient from the overall sample of 4537 patients resulted in a total of 213 patients eligible for the study. Twelve of the 213 patients refused to co-operate and 103 patients could not be reached or did not respond, giving a response rate of 46% (98/213). The mean age of the respondents was 30 years and 68% were males. The median of the injury severity, as measured by the Injury Severity Score (ISS),[10] amounted to 1 (SD: 1, range: 1–4). No significant differences concerning these characteristics or the type of injury and the body region were noted in relation to the group of non-respondents (see table 1).

FOLLOW-UP RESULTS

On average 3.8 years (median: 3.8, SD: 0.8 range 2.3–5.3) had elapsed since the accident. Nine percent of the respondents had received a low standard of education, ranging from no education to elementary school or lower vocational education, whereas 57% were educated to an intermediate standard of secondary school or intermediate vocational education and 34% were highly educated having received university education or higher vocational education. Half of the population (48%) participated competitively in sports. Outdoor soccer ($n = 25$; 26%), volleyball (12; 12%) and skiing (8; 8%) were the types of sport accounting for the largest number of sports injuries (table 2). Male predominance was found in outdoor and indoor soccer, speed skating and martial arts. In women relatively more injuries occurred during volleyball and skiing.

OUTCOME MEASURES

Continuing work, despite the injury, was possible for 37% ($n = 25$) of the total working population of 67 patients. Absenteeism from work lasted no longer than 1 month in 39% ($n = 25$) of the patients and no more than 3 months in 19% ($n = 13$) of the patients. The remaining 5% ($n = 3$) of the patients were unfit for work for up to a maximum of 8 months. At the time of the interview, no lasting absenteeism from work existed due to the sports injury (table 3). The majority of the patients (78%) had to refrain from sports participation (table 3) for some time, up to a maximum of 1 year, and 11% of the population ($n = 11$) did not resume sports activities at all because of the sports injury.

Despite the standard medical treatment, 20% ($n = 20$) of the patients at the time of the follow-up answered the question 'do you still experience disabilities and handi-

caps following the sports injury?' affirmatively, despite standard medical treatment. Furthermore, 9% ($n = 9$) of the population had a sumscore larger than 0 on the SIP68, also indicating that some degree of disability or handicap following the sports injury is experienced. If we compare our results of the SIP68 with the results of patients with a spinal cord lesion or patients with neck/low back pain[12] (table 4), it is clear that the disablement is far lower in the patients injured by a sporting activity (mean SIP68 sumscore: 0.4 vs. 22.3 and 4.1 respectively, $p < 0.001$).

Table 1 Basic characteristics of respondents, total sample and total population

	Respondents	*Total sample*	*Total population*
Number of patients	98	213	4537
Age (mean/SD/range)	30/12/18–54	29/9/18–56	30/9/18–56
Sex (% male)	67%	72%	72%
Iss (median/SD/range)	1/1.3/1–4	1/1.3.1–9	1/1.5/1–10
Type of injury:			
fracture	21%	19%	16%
soft tissue injury	78%	80%	82%
intra cranial injury	0%	0%	2%
rest	0%	1%	0%
Body region:			
head/neck	9%	7%	13%
trunk	0%	3%	2%
upper extremity	38%	34%	40%
lower extremity	49%	56%	45%

Table 2 Number of injured patients: total, males and females per type of sport

Type of sport	*Patients (N, %)*	*Males (N, %)*	*Females (N, %)*
Soccer (outdoor)	25 (26%)	22 (35%)	3 (10%)
Volleyball	12 (12%)	7 (10%)	5 (26%)
Skiing	8 (8%)	3 (5%)	5 (16%)
Speed skating	6 (6%)	6 (9%)	–
Basketball	5 (5%)	3 (5%)	2 (7%)
Soccer (indoor)	5 (5%)	5 (8%)	–
Water skiing	4 (4%)	3 (5%)	1 (3%)
Horse riding	3 (3%)	–	3 (10%)
Hockey (field)	3 (3%)	2 (3%)	1 (3%)
Martial arts	3 (3%)	3 (5%)	–
Handball	3 (3%)	1 (2%)	2 (7%)
Rest	21 (21%)	12 (18%)	9 (30%)
Total	98 (100%)	67 (100%)	31 (100%)

Table 3 Absenteeism from work and sports due to the sports injury sustained

	Absenteeism from work (N, %) (n = 67)	*Absenteeism from sports (N, %) (n = 98)*
None	25 (37%)	3 (3%)
< 1 month	26 (39%)	21 (21%)
1–3 months	13 (19%)	29 (30%)
3 months–1 year	3 (5%)	26 (27%)
Permanent	–	11 (11%)
Unknown	–	8 (8%)

RISK FACTORS

By using the outcome measure – experienced disabilities and handicaps – as a dependent variable in a logistic regression analysis, one variable (body region) emerged as a significant predictor concerning the occurrence of long-term consequences of sports injuries. It was found to be significant that injuries to the knee more often incurred long-term disabilities and handicaps than other injuries (Odds ratio: 13.8, 95% C.I.: 2.7–70.1).

When the outcome measure: SIP68-sumscore = 0 vs. SIP68-sumscore > 0 is applied, sex appeared to be a significant predictor of long-term disablement. In women, the chance of persisting disabilities and handicaps is higher than in men (Odds ratio: 5.0, 95% C.I.: 1.2–21.7).

Discussion

The highest number of accidents requiring hospital treatment are home and leisure accidents (44%).[2] Accidents following sports participation are in number the second cause of injury (21%) needing hospital treatment. The vast majority of these injuries (92.1%) are treated in outpatient department, and only 7.9% are admitted. The patients requiring hospitalization often experience long-term consequences following their injury, which has implications for both patient and society in terms of costs and reliance on social services.[3] If long-term disabilities and handicaps are experienced

Table 4 Results of SIP68: comparison of patients with a sports injury to patients with a spinal cord injury (SCI) and patients with neck or back complaints.[7]

*SIP68**	*Sports injuries*	*SCI*	*Neck/back complaints*
Subscales:	(n = 98)	(n = 41)	(n = 338)
Somatic autonomy	0.1	6.5	0.2
Mobility control	0.1	6.6	1.0
Emotional stability	0.0	0.8	0.4
PACS**	0.1	1.1	0.7
Social behaviour	0.2	4.6	1.6
Mobility range	0.0	2.6	0.2
Sumscore	0.5	22.3	4.1

*: SIP68: Sickness Impact Profile–68 items version
**: Psychological autonomy and communication scales

by the sizeable group of patients with sports injuries treated as outpatients, then the personal and societal implications could be more serious than was first expected. However, thus far, outcome studies have focused only on short term consequences, or on a limited part of the disabilities and handicaps, or primarily on impairments. Other studies have focused on children or on one type of sport or on specific body regions.[6, 16–27] This study aims to investigate the entire spectrum of disabilities and handicaps following outpatient treated sports injuries. No significant differences concerning the basic characteristics between the total population of outpatients and the sample of respondents were found. It can therefore be assumed that the respondents accurately represent the entire population of outpatients. However, some caution regarding this statement is needed if we review the response rate of 46%. This fair response rate is probably due to the fact that we only studied outpatients. In our experience, clinically treated patients who sustained a sports injury are more willing to co-operate. This is based on the fact that in a previous study we realised a response rate of 75%.[3] An explanation for this difference may be that an injury needing admission generally results in more patient-hospital staff interaction and therefore results in more commitment by the patient to collaborate in a study. Different criteria can be used to determine the severity of an injury. Apart from the ISS[15] and inpatient or outpatient treatment following the injury,[2] long-term consequences arising from the injury[2, 27] may serve this purpose.

In this study 'experienced disabilities and handicaps', the SIP68, and absenteeism from work and sports participation were all used to assess long-term consequences of an injury. In general it is assumed that patients treated in an outpatient facility experience fewer disabilities and handicaps than patients admitted to a hospital because of an injury. In the present study, however, we found that a considerable proportion (20%) answered the question 'Do you still experience disabilities and handicaps following the sports injury?' affirmatively. Furthermore, 9% of the population indicated some degree of disability or handicap by means of the results of the SIP68. This finding is confirmed by van der Sluis *et al*[5] declaring that the outcomes of 'lesser' injuries may have more serious consequences than we tend to assume.

Nearly two-thirds of the working population experienced absenteeism from work following the sports injury. Although this proportion is smaller, and the duration of the sick leave is on average shorter than in the population of patients admitted because of a sports injury,[3] the previously mentioned societal consequences could be considerable when the large number of outpatients are taken into account.

Sports injuries may also have substantial personal consequences. This is underlined by the fact that after a period of 3–4 weeks absenteeism from sports may lead to psycho social problems.[28, 29] The majority of the patients involved in our study were not able to participate in sports for up to or more than 1 year. Physicians often underestimate these psycho social aspects. Therefore, we suggest that patients suffering from sports injuries and prone for long-term disablement should be treated in a specific multidisciplinary setting. In such a treatment setting a psychologist or a social worker could work together with a physiotherapist and a rehabilitation physician.

Logistic regression analysis was used in order to establish which patients are at risk of experiencing long-term consequences due to a sports injury. Women turned out to be more prone to experience long-term disabilities and handicaps following a sports injury than men. Apart from the fact that in general women tend to present more health problems than men,[30] no explanation for this sex difference could be deduced from our study results.

The variable body region also proved to be a risk factor. Knee injuries more often lead to disabilities and handicaps than injuries to other areas of the body. This finding is supported by the results of other studies[31, 32] stating that long-term consequences can occur following any sports injury, but in particular following knee strains.

Conclusion

In this study, substantial long-term disabilities and handicaps were found in patients treated for sports injuries at an outpatient department. The importance of this finding is emphasized by the fact that the absolute number of outpatients by far exceeds the number of inpatients. On average these consequences were not as severe and lasting as in clinically treated patients, however, absenteeism from work and sports activities was considerable.

Women with a sports injury and patients suffering from a knee injury are particularly at risk of developing long-term consequences. During follow-up, therefore, special attention should be paid to these patient categories. Research should be carried out to develop specific rehabilitation programmes on behalf of patients who sustained sports injuries, resulting in fewer disabilities and handicaps.

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